

Top 10 Resources Every SAS® Administrator Should Know About

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ABSTRACT

When assisting SAS® customers who are experiencing performance issues, we are often asked by the SAS users at a customer site for the top 10 guidelines to share with those who have taken on the role of system administrator or SAS administrator. This paper points you to where you can get more information regarding each of the guidelines and related details on the SAS website.

INTRODUCTION

In pulling together the list of guidelines, the websites have quickly grown to more than 10, so we are going to group them into common themes so that you can use the links as reference points.

Let's start by defining what we mean when we say SAS Administrator. This role varies widely at SAS customer sites, from the SAS expert who knows everything about SAS software, to the person who installs and maintains the SAS images, to the person who maintains the computer resources that SAS runs on, to all of the above. Because of this, you are going to see lots of different topics covered.

The groupings we use come from the types of conversations we have with SAS customers. They follow the logical flow of what is needed from a hardware perspective, especially after the SAS customer has received a hardware recommendation from the SAS Enterprise Excellence Center. The hardware recommendation is based on how the SAS customer want to use (or is currently using) SAS.

INFORMATIVE BLOGS

This group is for existing SAS customers who would like to stay informed on lessons learned and new updates. It seems that the most popular method for doing this is by the various SAS Administrator blogs. Here is a list of the ones I enjoy reading:

- [SAS Administrator blog](#). This blog covers the gamut from discussing how to set up your computer resources (physical hardware, storage arrays, file systems, including clustered or shared file systems), to tricks when using various SAS components, to doing performance monitoring of the computer systems you are running SAS on to avoid unwanted bottlenecks.
- [IT Whisperer blog](#). This blog takes a different perspective to the previous blog. This one is written from the eyes of an IT guru who is managing SAS users and their computer systems. There is one blog entry (the one titled :”The SAS administrator: your bridge between the SAS shop and IT” from November 7, 2013) that is of particular interest to SAS Administrators
- [Paul Homes’ Platform Admin blog](#). This blog is from a SAS user who covers topics that he runs into on a daily basis.
- [Andrew Ratcliffe's NOTE: blog](#). This blog contains hints, tips, and experiences of interest to a wide range of SAS practitioners.

GENERAL GUIDELINES

Now, let's start with what one needs to know when they set up a new hardware infrastructure for SAS. There are several general papers that address all of the topics below and explain why it is so important to make sure these topics addressed before you start installing SAS and loading your data. The papers are:

- [Guidelines for Preparing your Computer Systems for SAS](#) Contains guidelines about important aspects of hardware architecture, configuration, and setup.
- [Grand Designs: Why it Pays to Think About Technical Architecture Design Before you Act](#) A SAS Global Forum 2013 paper from our Global Technical Architecture group.

- [How to Maintain Happy SAS 9 Users](#) This is a good basic paper, and includes links to other, more specialized, papers.

BASIC CONFIGURATION INFORMATION

As mentioned at the start, my team works very closely with SAS customers – mainly the ones with performance issues – but we are starting to work more closely with new customers to help them properly configure their computer systems to best work with the way they plan to use SAS. These conversations tend to start after the SAS Account teams have done a hardware and workload analysis and recommendation (sizing exercise) via the SAS Enterprise Excellence Center (EEC). We take the information that this group puts together and go into more specifics.

The SAS EEC reviews the various system requirements associated with the licensed SAS products and lists them as part of the customer facing documentation from the sizing exercise. Here is a link to these for your reference:

- [System Requirements](#)
- [Install Center](#)
- [Third-Party Software Support](#)
- [System Administration topic](#) in Samples & SAS Notes which are authored by SAS Technical Support
- [Migration Focus Area](#)
- [SAS Deployment Online Community](#)

TUNING GUIDELINES – OPERATING SYSTEM

A great deal of information is available on tuning your SAS environment. The first category covers tuning guidelines for the customer's anticipated operating system. These guidelines have been jointly written by SAS and our partners and are based on both testing done at our various labs and from lessons learned with customers. Here are links to various operating system tuning guidelines:

- [SAS AIX 5L, AIX 6, and AIX 7 Tuning Guides](#)
- [Tuning Guidelines for SAS on Red Hat Enterprise Linux](#)
- [Deploying SAS 9 on Solaris 10: Calling Superheroes to Fight Supervillains](#) Provides advice on tuning Oracle Solaris 10.
- [Taking SAS to the enterprise: Kernel configuration guidelines for SAS 9 on HP-UX 11i v3](#)
- [Configuration and Tuning Guidelines for SAS 9 in Microsoft Windows Server 2008](#) Contains suggestions for configuring CPU, memory, and I/O subsystems for optimal SAS performance.
- [Moving SAS Applications from a Physical to a Virtual VMware Environment](#) Provides best practices and performance expectations.

TUNING GUIDELINES – SHARED FILE SYSTEMS

The next area of tuning is how you going to use SAS if you plan on using SAS Grid Manager or setting up a cluster of computer systems. This also includes a discussion of the need for a clustered or shared file system. Here are some papers on that subject:

- [A Survey of Shared File Systems \(updated August 2013\)](#) Helps in determining the best choice for your distributed applications.
- [Using SAS 9 and Red Hat's Global File System2 \(GFS2\)](#)
- [IBM GPFS tuning guidelines for deploying SAS on IBM Power servers](#)

SAS GRID

Speaking of SAS Grid Manager, below are several papers that talk about the things that need to be reviewed before you set up your SAS grid hardware infrastructure. In addition to these papers, I strongly suggest that you work with SAS Professional Services and schedule a formal SAS grid workshop so that you can discuss exactly how you would like to layout the nodes in your SAS grid.

- [SAS GRID 101: How It Can Modernize Your Existing SAS Environment](#)
- [SAS Goes Grid – Managing the Workload across Your Enterprise](#)
- [High Availability Services with SAS Grid Manager](#)
- [High Availability with SAS Grid Manager](#)
- [How to Interface Your Enterprise Scheduler with SAS Grid Manager](#)
- [The Top Four User-Requested Grid Features Delivered with SAS Grid Manager 9.4](#)
- [LSF with OS Partitioning and Virtualization](#)
- [Best Practices for using the SAS Scalable Performance Data Server in a SAS Grid Environment](#)

TUNING GUIDELINES – SAS SERVERS

Along with the previous information on setting up a SAS grid, here are some tuning guidelines for the various SAS servers (such as the mid-tier server or the SAS Metadata Server) that need to be reviewed and considered when planning:

- [Enterprise Management Integration focus area](#)
- [Considerations for Implementing a Highly Available or Disaster Recovery Environment](#)
- [Backup and Disaster Recovery: When Disaster Strikes, What Will You Do? What Will You Do?](#)
- [SAS 9.4 Intelligence Platform System Administration Guide](#)
 - [Using Metadata Server Clustering](#)
 - [Understanding Server Load Balancing](#)
 - [High-Availability Features in the Middle Tier](#)
- [SAS 9.4 Intelligence Platform Security Administration Guide](#)
- [SAS 9.3 Administration Guilty Pleasures: A Few of My Favorite Things](#)
- [Best Practice Implementation of SAS Metadata Security at Customer Sites in Denmark](#)
- [Security Hardening for SAS 9.3 Enterprise BI Web Applications](#)
- [What SAS Administrators Should Know About Security and SAS Enterprise Guide](#)

TUNING GUIDELINES – IO SUBSYSTEMS

Enough about SAS grid, let's talk about one the key areas that need to be configured properly in order to gain the best performance with your SAS application – IO subsystems. Here are some papers on that subject:

- [Best Practices for Configuring your IO Subsystem for SAS 9 Applications](#)
- [Frequently Asked Questions Regarding Storage Configurations.](#)
- [Best Practices for Configuring Your IO Subsystem for SAS 9 Applications](#) (webinar)

TUNING GUIDELINES - HARDWARE

There are times that we have to do something from a hardware perspective before deploying SAS. One example of this is with the IBM POWER7 systems that will be configured to run multiple logical partitions (LPARs). The default way to configure the LPARs do not work well for SAS applications doing heavy analytics. Here is a must read on this subject:

- [SAS deployment on IBM Power servers with IBM PowerVM dedicated-donating LPARs](#)

TUNING GUIDELINES – STORAGE ARRAYS

In helping SAS customers with performance issues, we have learned a lot about the various storage arrays, such as storage area networks (SANs), network-attached storage (NAS), or storage appliances. In almost all cases, the default settings for these arrays do not perform well with the large sequential I/O processing associated with SAS. As we learn things, we create papers listing the various tuning guidelines for each storage array. Here is what we have so far, but we have many others in the works:

- [SAS and the New Virtual Storage Systems](#)
- [Best Practices for SAS on EMC SYMMETRIX VMAX Storage](#)
- [SAS 9 on IBM Storwize family storage systems: Architecture, setup and tuning guidelines](#)
- [Storage Best Practices: SAS 9 with IBM System Storage and IBM Power Systems](#)

HELPFUL TOOLS

Another area that we would like to share with you is many “tools” that have been written to help SAS customers. Here is a list of the more common ones that we suggest to SAS customers to use. This group is something you should bookmark and refer to throughout the various phases of your SAS usage.

- IO throughput testing – used to determine the IO throughput that a file system being used for SAS files can sustain. There are examples of SAS commands and external commands that can be used.
- For UNIX or Linux: <http://support.sas.com/kb/51/660.html>
- For Windows: <http://support.sas.com/kb/51/659.html>
- Removing orphaned SAS WORK directories – there is a tool that ships with SAS for all UNIX and Linux releases. It is in the SASHOME/utilities/bin folder and is called cleanwork.

TRAINING OPTIONS

There are a lot of papers listed above, but for those who would like to attend training to augment what you read below are some options for you. I recommend that you budget funds and time for training at specific times (such as before you begin a new deployment, when a new administrator joins your team, when you need a refresher, and so forth.) SAS training options include:

- [Courses and training paths](#) for the administrator
- [SAS Global Certification](#) program for platform administrators
- [Product documentation](#) for the SAS Intelligence platform

PERFORMANCE MONITORING

On a different note, a topic that comes up a lot has to do with troubleshooting performance issues that SAS customers are having. Over the years my team has written several papers that cover how to define the performance issue and how to use hardware monitoring tools to determine if the performance issue is coming from your hardware infrastructure. Here is a list of these papers:

- [Solving SAS Performance Problems: Employing Host Based Tools](#) This paper contains host-specific monitoring scripts.
- [A Practical Approach to Solving Performance Problems with SAS](#)
- [SAS Performance Monitoring - A Deeper Discussion](#)
- [Logging 101: Leveraging the SAS Enhanced Logging Facility](#) For versions of SAS prior to SAS 9.4

In addition to all of the above links, another one you should book mark is the [List of Useful Papers](#) on the support.sas.com website. This is the primary place where we put new papers that fit into the new themes.

CONCLUSION

Many customers find that it's useful to share these resources within their organizations. Some organizations have intranets or Sharepoint sites where they can post links and papers. Others create in-house SAS Users Groups to facilitate sharing of information. Still others rely on SAS for topics they can share in internal newsletters and lunch and learn sessions. All of these are excellent ideas. Please note we will announce new papers and updates to existing papers on the [SAS Administrator](#) Blog.

ACKNOWLEDGMENTS

Thanks to Christina Harvey for her [blog](#) that listed many of the above references, for SAS Technical Support and SAS Customer Loyalty groups for their customer feedback, and for everyone who reviewed the paper.

CONTACT INFORMATION

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